CLAIMS

We claim:

1. A load cell deflasher assembly for the processing of product from an extrusion comprising:

a positioning actuator operatively interconnected with a punch and capable of extension and retraction of said punch, said punch having at least one exteriorly facing punch surface cooperatively aligned to interact with said extrusion against a die, said positioning actuator having an encoder in communication with a programmable logic controller, said encoder being capable of monitoring the position of said punch and communicating the same to said programmable logic controller,

a load cell pressure transducer interconnected with said positioning actuator for measuring the pressure of said punch against said extrusion at said die, said load cell pressure transducer capable of communicating said pressure measurements to said programmable logic controller,

said positioning actuator being capable of extension or retraction of said punch in response to a command of said programmable logic controller based on said pressure measurement.

2. The load cell deflasher assembly of claim 1 wherein if said pressure measurements of said load cell pressure transducer communicated to said programmable logic controller is equal to or less than a selected threshold limit an extension punch stroke is completed.

3. The load cell deflasher assembly of claim 1 wherein if said pressure measurements of said load cell pressure transducer communicated to said programmable logic

controller is greater than a selected threshold limit an extension punch stroke is aborted in favor of a retraction punch stroke.

4. The load cell deflasher assembly of claim 1 wherein said punch includes a plurality of punch surfaces cooperatively aligned to a corresponding plurality of shear pockets of a die.

5. The load cell deflasher assembly of claim 4 wherein said plurality of punch surfaces are supported by at least one backing plate.

6. The load cell deflasher assembly of claim 4 wherein said plurality of shear pockets of a die are supported by at least one backing plate.

7. The load cell deflasher assembly of claim 1 wherein said punch is interconnected upon at least one support rail for axial extension and retraction.

8. A positioning assembly for variable positioning of an extrusion relative to a punch and die of a deflashing assembly comprising:

a positioning actuator cooperatively aligned with said punch and a die, said positioning actuator having an encoder in communication with a programmable logic controller,

a gripper carriage engaged to said positioning actuator having means for gripping said extrusion and delivering said extrusion to a deflash position in intervening proximity between said punch and die,

said encoder being capable of monitoring the position of said gripper carriage relative to said positioning actuator and communicating the same to the programmable logic controller,

said positioning actuator being capable of adjustably positioning said gripper carriage relative to said positioning actuator in response to a command of said programmable logic controller to thereby alter the deflash position of said extrusion in intervening proximity between said punch and die.

9. The positioning assembly of claim 8 wherein said means for gripping said extrusion and delivering said extrusion to a deflash position in intervening proximity between said punch and die comprise a shuttle plate interconnected with said gipper carriage having at least one gripper, said gripper terminating in a gripper jaw capable of engaging said extrusion card and delivering the same in adjustable proximity between said punch and die by movement of said gripper carriage relative to said positioning actuator.

10. The positioning assembly of claim 9 wherein said gripper jaw engages the extrusion at a defined reference point thereof, said reference point being indicative of the relative location of the product to be deflashed from the extrusion.

11. The positioning assembly of claim 10 wherein said reference point is an irregular surface area at an upper portion of said extrusion.

12. The positioning assembly of claim 9 wherein said shuttle plate has a pair aligned grippers, said grippers terminating in a pair of aligned gripper jaws capable of engaging said extrusion and delivering the same in proximity to said punch and die by movement of said gripper carriage relative to said positioning actuator.

13. The positioning assembly of claim 12 wherein said gripper jaws engage the extrusion, respectively, at a proximal defined reference point thereof and at a distal defined reference point thereof, said reference points, in combination, being indicative of the relative location of the product to be deflashed from the extrusion.

14. The positioning assembly of claim 13 wherein said proximal and distal reference points are each an irregular surface area at an upper portion of said extrusion, said surface areas comprising borders indicating, in combination, the relative location of the product to be deflashed from the extrusion there between.

15. The positioning assembly of claim 8 wherein said engagement of said gripper carriage with said positioning actuator comprises the positioning actuator having a longitudinal slot and a side portion of said gripper carriage being suited to engage said longitudinal slot for linear movement therein in response to commands of said programmable logic controller executed by said positioning actuator.

16. The positioning assembly of claim 8 wherein said adjustable position of said gripper carriage relative to said positioning actuator in response to a command of said

programmable logic controller presents an entire extrusion to the punch and die for deflashing.

17. The positioning assembly of claim 8 wherein said adjustable position of said gripper carriage relative to said positioning actuator in response to a command of said programmable logic controller presents only a portion of said extrusion to the punch and die for deflashing.

18. The positioning assembly of claim 17 wherein said product of said extrusion is sequentially presented to the punch and die for deflashing.

19. The positioning assembly of claim 9 further including a setting body attached to said shuttle plate which is movable to position at least a portion of said extrusion against said die.

20. The positioning assembly of claim 19 wherein said setting body is movable in a direction perpendicular to the path of said shuttle plate.

21. The positioning assembly of claim 9 wherein upon the extrusion being deflashed, the gripper jaw of the gripper opens to drop the deflashed extrusion and the gripper carriage returns to a paison pick up position to obtain a new extrusion.

22. The positioning assembly of claim 15 wherein the locus of said engagement of said gripper carriage within said longitudinal slot of said positioning actuator defines a extrusion pick up position of said gripper carriage at a portion of said longitudinal slot proximal to a supply of

extrusions and a extrusion deflashing position and a portion of said longitudinal slot distal from the supply of extrusions.

23. The positioning assembly of claim 22 wherein the extrusion deflashing position is variable along said portion of said longitudinal slot distal from the supply of extrusions.

24. A load cell deflasher assembly for the processing of product from an extrusion in combination with a positioning assembly for variable positioning of said extrusion relative to a punch and die of said deflashing assembly comprising:

a first positioning actuator operatively interconnected with a punch and capable of extension and retraction of said punch, said punch having at least one exteriorly facing punch surface cooperatively aligned to interact with said extrusion against a die, said first positioning actuator having a first encoder in communication with a programmable logic controller, said first encoder being capable of monitoring the position of said punch and communicating the same to said programmable logic controller,

a load cell pressure transducer interconnected with said first positioning actuator for measuring the pressure of said punch against said extrusion at said die, said load cell pressure transducer capable of communicating said pressure measurements to said programmable logic controller,

said first positioning actuator being capable of extension or retraction of said punch in response to a command of said programmable logic controller based on said

pressure measurement,

a second positioning actuator cooperatively aligned with said punch and a die, said second positioning actuator having a second encoder in communication with said programmable logic controller,

a gripper carriage engaged to said second positioning actuator having means for gripping said extrusion and delivering said extrusion to a deflash position in intervening proximity between said punch and die,

said second encoder being capable of monitoring the position of said gripper carriage relative to said second positioning actuator and communicating the same to the programmable logic controller,

said second positioning actuator being capable of adjustably positioning said gripper carriage relative to said second positioning actuator in response to a command of said programmable logic controller based on said pressure measurements of the load cell pressure transducer to thereby set or vary the deflash position of said extrusion in intervening proximity between said punch and die.

25. The load cell deflasher assembly in combination with the positioning assembly of claim 24 wherein said programmable logic controller further includes a trending database of logged pressure measurements of said load cell pressure transducer.

26. The load cell deflasher assembly in combination with the positioning assembly of claim 25 wherein said programmable logic controller further includes an auto-tune mode such that if said programmable logic controller detects an upward trending of said pressure measurements

in said trending database exceeding a selected threshold limit, said auto-tune mode of the programmable logic controller is activated.

27. The load cell deflasher assembly in combination with the positioning assembly of claim 26 wherein upon activation of said auto-tune mode of said programmable logic controller, in a subsequent deflashing cycle of extrusion, the programmable logic controller commands said second positioning actuator to make a adjustment to the deflash position of said gripper carriage relative to said second positioning actuator.

28. The load cell deflasher assembly in combination with the positioning assembly of claim 27 wherein the adjustment to the deflash position of said gripper carriage relative to said second positioning actuator is in the range of 0.0001 of an inch to 0.01 of an inch.

29. The load cell deflasher assembly in combination with the positioning assembly of claim 27 wherein the adjustment to the deflash position of said gripper carriage relative to said second positioning actuator is in a segmentally measured direction distal from a extrusion pickup position.

30. The load cell deflasher assembly in combination with the positioning assembly of claim 27 wherein the adjustment to the deflash position of said gripper carriage relative to said second positioning actuator is in a segmentally measured direction proximal to a extrusion pickup position.

31. The load cell deflasher assembly in combination with the positioning assembly of claim 27 wherein upon having made an adjustment to the deflash position of said gripper carriage relative to said second positioning actuator, the programmable logic controller determines a change in said trending database.

32. The load cell deflasher assembly in combination with the positioning assembly of claim 31 wherein if said change in said trending database represents a decrease in said pressure measurement of said load cell pressure transducer, the programmable logic controller commands a further adjustment to the deflash position of said gripper carriage relative to said second positioning actuator in the same segmentally measured direction as the initial adjustment thereof.

33. The load cell deflasher assembly in combination with the positioning assembly of claim 32 wherein if said further adjustment to the deflash position of said gripper carriage relative to said second positioning actuator in the same segmentally measured direction as the initial adjustment thereof results in a change in said trending database representing a decrease in said pressure measurement of said load cell pressure transducer, the programmable logic controller commands still further sequential adjustments to the deflash position of said gripper carriage relative to said second positioning actuator continuing in the same segmentally measured direction as the immediately prior adjustment thereof until the trending database determines an increase in said pressure measurement of said load cell pressure transducer.

34. The load cell deflasher assembly in combination with the positioning assembly of claim 33 wherein upon determining said increase in said pressure measurement of said load cell pressure transducer, the programmable logic controller commands an adjustment to the deflash position of said gripper carriage relative to said second positioning actuator to the position where the trending database determines the pressure measurement of said load cell pressure transducer was at a minimum.

35. The load cell deflasher assembly in combination with the positioning assembly of claim 34 wherein upon adjusting the deflash position of said gripper carriage relative to said second positioning actuator to the position where the trending database determines the pressure measurement of said load cell pressure transducer was at a minimum, said auto-tune mode of said programmable logic controller shuts off until it is again activated by said programmable logic controller detecting an upward trending of said pressure measurements in said trending database exceeding a selected threshold limit.

36. The load cell deflasher assembly in combination with the positioning assembly of claim 31 wherein if said change in said trending database represents an increase in said pressure measurement of said load cell pressure transducer, the programmable logic controller commands a further adjustment to the deflash position of said gripper carriage relative to said second positioning actuator in a segmentally measured direction opposite the initial adjustment thereof.

37. The load cell deflasher assembly in combination with the positioning assembly of claim 36 wherein if said further adjustment to the deflash position of said gripper carriage relative to said second positioning actuator in the segmentally measured direction opposite the initial adjustment thereof results in a change in said trending database representing a decrease in said pressure measurement of said load cell pressure transducer, the programmable logic controller commands still further sequential adjustments to the deflash position of said gripper carriage relative to said second positioning actuator continuing in the same segmentally measured direction as the immediately prior adjustment thereof until the trending database determines an increase in said pressure measurement of said load cell pressure transducer.

38. The load cell deflasher assembly in combination with the positioning assembly of claim 37 wherein upon determining said increase in said pressure measurement of said load cell pressure transducer, the programmable logic controller commands an adjustment to the deflash position of said gripper carriage relative to said second positioning actuator to the position where the trending database determines the pressure measurement of said load cell pressure transducer was at a minimum.

39. The load cell deflasher assembly in combination with the positioning assembly of claim 38 wherein upon adjusting the deflash position of said gripper carriage relative to said second positioning actuator to the position where the trending database determines the

pressure measurement of said load cell pressure transducer was at a minimum, said auto-tune mode of said programmable logic controller shuts off until it is again activated by said programmable logic controller detecting an upward trending of said pressure measurements in said trending database exceeding a selected threshold limit.

40. The load cell deflasher assembly in combination with the positioning assembly of claim 26 further includes an alarm which is activated if said auto-tune mode of said the programmable logic controller is unable to stop an upward trending of said pressure measurement readings of said load cell pressure transducer after having made a sequential adjustments to the deflash position of said gripper carriage relative to said second positioning actuator in directions both proximal and distal of the extrusion pick up position.

41. The load cell deflasher assembly in combination with the positioning assembly of claim 41 wherein said alarm is an audible or visual signal.

42. A method for deflashing product from an extrusion adjustably positioned in intervening proximity between a punch and die comprising the steps of:

monitoring the position of said punch,

communicating the monitored position of said punch to a programmable logic controller,

measuring the pressure of the punch against said extrusion at said die

communicating said pressure measurement to said programmable logic controller,

setting a threshold limit of allowable pressure of the

punch against said extrusion at said die,

controlling the extension and retraction of the punch stroke of said punch in response to said pressure measurement by commands of said programmable logic controller executed by a positioning actuator of the punch wherein if the measured pressure of the punch against said extrusion at said die is equal to or less than said threshold limit allowing the punch stroke to be completed and wherein if the measured pressure of the punch against said extrusion at said die is greater than said threshold limit retracting the punch stroke.

43. A method for adjustably positioning an extrusion in intervening proximity between a punch and die for deflashing comprising the steps of:

gripping said extrusion by structure interconnected with a gripper carriage engaged to a positioning actuator,

monitoring the position of said gripper carriage relative to said positioning actuator,

communicating the monitored position of said gripper carriage relative to said positioning actuator to a programmable logic controller,

delivering said extrusion to a deflash position in intervening proximity between said punch and die,

measuring the pressure of the punch against said extrusion at said die at the deflash position,

communicating said pressure measurement to said programmable logic controller,

adjusting the deflash position by commands of said programmable logic controller executed by said positioning actuator of the gripper carriage.

44. The method for adjustably positioning an extrusion

in intervening proximity between a punch and die for deflashing of claim 43 further comprising the steps of

maintaining a trending database of the pressure measurements communicated to said programmable logic controller, and

determining any trend of the pressure measurements.

45. The method for adjustably positioning an extrusion in intervening proximity between a punch and die for deflashing of claim 44 further comprising the step of

adjusting the previous deflash position in a segmentally measured selected direction in response to the determined trend by command of said programmable logic controller executed by said positioning actuator of the gripper carriage.

46. The method for adjustably positioning an extrusion in intervening proximity between a punch and die for deflashing of claim 45 further comprising the step of

monitoring any change in the pressure measurement resultant from the newly adjusted deflash position in a segmentally measured selected direction.

47. The method for adjustably positioning an extrusion in intervening proximity between a punch and die for deflashing of claim 46 wherein if the monitored change indicates a decrease in the pressure measurement, then performing the step of

adjusting the prior deflash position further in said segmentally measured selected direction.

48. The method for adjustably positioning an extrusion in intervening proximity between a punch and die for

deflashing of claim 47 wherein if the monitored change of the further adjustment indicates a decrease in the pressure measurement, then performing the step of

sequentially adjusting the prior deflash position still further in said segmentally measured selected direction until trending database determines an increase in said pressure measurement.

49. The method for adjustably positioning an extrusion in intervening proximity between a punch and die for deflashing of claim 48 wherein upon determining the increase in said pressure measurement the following step is preformed:

returning the deflash position of said extrusion to the position where the trending database determines the pressure measurement was at a minimum.

50. The method for adjustably positioning an extrusion in intervening proximity between a punch and die for deflashing of claim 46 wherein if the monitored change indicates a increase in the pressure measurement, then performing the step of

adjusting the prior deflash position further in a segmentally measured direction opposite the initially selected direction.

51. The method for adjustably positioning an extrusion in intervening proximity between a punch and die for deflashing of claim 50 wherein if the monitored change of the further adjustment indicates a decrease in the pressure measurement, then performing the step of

sequentially adjusting the prior deflash position still further in said segmentally measured opposite direction

until trending database determines an increase in said pressure measurement.

52. The method for adjustably positioning an extrusion in intervening proximity between a punch and die for deflashing of claim 51 wherein upon determining the increase in said pressure measurement the following step is preformed:

returning the deflash position of said extrusion to the position where the trending database determines the pressure measurement was at a minimum.